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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,287	09/22/2003	Nobuaki Kubo	243055US2	5622

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EXAMINER	
PHAM, HAI CHI	
ART UNIT	**PAPER NUMBER**
2861	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/16/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/16/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/665,287	KUBO, NOBUAKI	
	Examiner	Art Unit	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12,14,17-26 and 29-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *50-55* is/are allowed.

6)☒ Claim(s) *12,14,17,18,23,26,29-49 and 56* is/are rejected.

7)☒ Claim(s) *19-22,24 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL REJECTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 12, 14, 18, 23, 26, 29-32, 39-49 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. 6,452,687) in view of Ono (JP 2001-194613).

Suzuki et al. discloses a color image forming apparatus including a light scanning device, which comprises an optical element (diffracting optical element 10C) that images, on an image holding body (photosensitive drum 1C), a light beam emitted from a light source (light source unit 1), a holding member (holding member 14, Fig. 9) that holds the optical element, scanning line curve correcting means (adjuster screw 12 for correcting the curving deviation of the scanning line) (col. 17, lines 1-13) (Fig. 9) for correcting the optical element in a sub scanning direction to correct a scanning line in the sub scanning direction, the scanning line being formed by the light beam, and scanning line inclination correcting means (angle adjusting member 15 and spring 16 for tilting the diffractive optical element 10C) for entirely tilting the optical element around a supporting point positioned at a center of the optical element along the scanning line to correct an inclination of the scanning line (e.g., by moving the angle adjusting member 15 to the left

or to the right with the spring 16 as a counterbalance weight, the diffractive optical element 10C is rotated around the center supporting point or rotation support 80 in the directions of the curved arrows A so as to correct the slant deviation of the scanning line) (col. 17, lines 20-29) (Fig. 10), wherein the supporting point (rotation support 80) is positioned near an optical axis of the optical element and is in contact with a center of the holding member in a plane parallel to the scanning line and perpendicular to the optical axis of the optical element (the supporting point or rotation support 80 is located near the optical axis of the laser beam L as shown in Fig. 9, and is in contact with the holding member 14 at its center and the point of contact is within the plane parallel to the scanning line and perpendicular to the optical axis of the laser beam L) (Figs. 9-10), and wherein at least one part of the scanning line curve correcting means, and at least one part of the scanning line inclination correcting means are provided integrally with the holding member (the two scanning line inclination and curve adjusting units being an integral part of the assembly as shown in Figs. 9 and 10).

Suzuki et al. fails to teach the holding member including a supporting member supporting the optical element from the sub-scanning direction to include a reference surface that contacts with the optical element to provide a reference position for the optical element and that does not correspond to both end parts of the optical element, and the pressing means being disposed opposite to the reference surface, the pressing means including a screw that moves the optical element in the sub-scanning direction.

Ono discloses an optical scanner comprising a scanning lens (11), a holding part (30) for supporting the scanning lens from the sub-scanning direction, the holding part

having a reference surface (30a, Fig. 1c) that contacts the bottom surface of the scanning lens (bottom surface of the supporting part 11c of the scanning lens), and a pressing means (adjustable screw 33) being provided on the top surface of the scanning lens, opposite to the reference surface with respect to the scanning lens so as to correct a scanning line curve by turning the screw in the forward or backward direction in the sub-scanning direction.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to the holding member for supporting the scanning lens with a reference surface being defined at the contact surface between the holding member and the scanning lens in the device of Suzuki et al. as taught by Ono. The motivation for doing so would have been to provide a stable reference position to the scanning so as the compensation for a curve in the scanning line can be made with the provided adjusting screw.

Suzuki et al. further teaches:

- The scanning line inclination correcting means entirely tilts the holding member (14) together with the optical element (10C) to correct the inclination of the scanning line (Fig. 10),
- independently of each other, the scanning line curve correcting means and the scanning line inclination correcting means correct the scanning line (the inclination and curve deviation of the scanning line being independently corrected by rotating the optical element in different directions as shown by the directions of the arrows A and B, respectively) (col. 16, lines 62-64) (Figs. 9 and 10),

- the light scanning device is used for scanning a plurality of the image holding bodies (photoreceptor drums 1BK, 1Y, 1M, 1C) by the light beams (Fig. 3),
- the plurality of image holding bodies are provided for forming toner images of colors that are different from each other (colors BKYMC),
- the scanning line curve correcting means and the scanning line inclination correcting means correct at least one beam of the beams corresponding to the plurality of image holding bodies, respectively (col. 20, lines 50-67),
- a fixed member (body chassis 8, Fig. 10) that supports the holding member (14) such that the holding member is movable in a direction of correcting the inclination of the scanning line (e.g., directions of the arrows A), wherein the scanning line inclination correcting means comprises an elastic member (spring 16) that is provided integrally with the holding member and the fixed member, and that supports the holding member such that the holding member is movable relative to the fixed member in the direction of correcting the inclination of the scanning line, and holding member tilting means (angle adjusting member 15 of Fig. 10 or 150 of Fig. 11) for tilting the holding member against force generated from the elastic member,
- the scanning line inclination means comprising a driving means (e.g., angle adjusting member 150 and stepping motor 151, Fig. 11), an inclination detection means (detecting device 20 comprising detection sensor portions 20a, 20b, 20c) (Fig. 4) (col. 12, lines 1-27), control means (not shown) for causing the driving

means to entirely tilting the holding member in accordance with the inclination of the scanning line detected by the inclination detection means (col. 16, lines 15-29),

- a fixed member (body chassis 8, Fig. 10) that supports the holding member such that the holding member is movable in a direction of correction of the inclination of the scanning line (the body chassis 8 supporting the holding member 14 through the rotation support 80 located at the center of the holding member and around which the holding member is rotated in a direction of correction of the inclination of the scanning line), the scanning line inclination correction means comprising an elastic member (spring 16) and the holding member tilting means (angle adjusting member 150 and stepping motor 151) that functions as the driving means, and that tilts the holding member against force generated from the elastic member,
- the elastic member includes a leaf spring and/or a coil spring (spring 16),

The method claims 45-48 are deemed to be clearly anticipated by functions of the above structures.

3. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. in view of Ono, as applied to claim 12 above, and further in view of Kanehashi (JP 11-231240).

Suzuki et al., as modified by Ono, discloses all the basic limitations of the claimed invention except for the plurality of the pressing means.

Kanehashi discloses an optical scanner including a mechanism for adjusting a scanning line bow having a plurality of adjusting screws (48) disposed along the

longitudinal direction of the mirror (23) such that the curve of the scanning line of different shapes can be finely adjusted (Fig. 6).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a plurality of adjusting screws as taught by Kanehashi in the device of Suzuki et al. The motivation for doing so would have been to be capable of adjusting the scanning line bow of different shapes.

4. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. in view of Ono, as applied to claim 12 above, and further in view of Toda (Pub. No. U.S. 2001/0017645).

Suzuki et al., as modified by Ono, discloses all the basic limitations of the claimed invention except for one of the colors being used as a standard color and the scanning line inclination correction being performed with respect to that of the standard color, and the standard color being black or magenta.

Toda discloses an image forming apparatus including a light scanning device, which comprises an optical element (optical imaging system including f-Π lens 44 and cylindrical mirror 48) that images, on an image holding body (photoreceptor drum 18), a light beam emitted from a light source (LD 36), a holding member (holder 76) that holds the optical element, scanning line curve correcting means (scanning line bent adjusting unit) (Fig. 8B) for correcting the optical element in a sub scanning direction to correct a scanning line in the sub scanning direction, the scanning line being formed by the light beam, and scanning line inclination correcting means (scanning line inclination adjusting

unit) (Fig. 8A) for entirely tilting the optical element to correct an inclination of the scanning line (the cylindrical mirror 48 being pressed at one end by the adjusting screw 90 such that the entire cylindrical mirror is tilted toward the sub-scanning directing), wherein at least one part of the scanning line curve correcting means, and at least one part of the scanning line inclination correcting means are provided integrally with the holding member (the two scanning line inclination and bent adjusting units being an integral part of the assembly as shown in Fig. 6). Toda further teaches that the color black being set as a standard color, and that the scanning line curve correcting means and the scanning line inclination correcting means perform correcting the scanning lines corresponding to the colors other than the standard color to conform to the scanning line of the standard color (paragraphs [0134]).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set a reference standard based on one of the colors for correcting the scanning line curve and inclination in the device of Suzuki et al. as taught by Toda. The motivation for doing so would have been to provide a simple and precise scanning line curve and inclination correction that ultimately registers the different colors to each other.

5. Claims 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. in view of Ono, as applied to claims 12 and 30 above, and further in view of Azumai et al. (U.S. 6,320,682).

Suzuki et al., as modified by Ono, further discloses a position displacement detection means (e.g., using one of the detection sensor portions of the detecting device 20, Fig. 4) for detecting a writing start position displacement in the sub scanning direction that is relative amount between the plurality of image holding bodies (col. 12, lines 30-37), wherein feedback control of the writing start position adjusting means is performed based on the writing start position displacement detected by the position displacement detection means, but fails to teach the rotating optical path refracting member, the optical path refracting member including a wedge-shaped prism.

Azumai et al. discloses an image forming apparatus including an optical path refracting member in the form of a wedge-shaped prism (315) including a rotating mechanism for rotating the prism in finely adjusting the scanning positions of the laser beam in the sub-scanning direction (col. 6, lines 30-63) (Fig. 4).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a rotating optical path refracting member in the form of a wedge-shaped prism as taught by Azumai et al. in the device of Suzuki et al. The motivation for doing so would have been to correct the positional deviation of the laser beam in the sub-scanning direction with a simple configuration and without having to cope with the phase deviation of the polygon mirror as suggested by Azumai et al.

Allowable Subject Matter

6. Claims 50-55 are allowed.

7. Claims 19-22 and 24-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments filed 11/13/06 have been fully considered but they are not persuasive.

Applicant argued that "since the contact points between the holding member (14) and the adjusting members (15/16) are relatively distant from the optical axis of the optical element (10C), an increase in the amount of the inclination correction causes an increase in the deviation of the optical axis height, which degrades the optical performance of the light scanning device of Suzuki" (emphasis added). The examiner respectfully disagrees. Firstly, the adjusting members (15/16) only rotate the optical element (10C) around the fixed rotation support (80), which is located at the center of the optical element, and thus cannot cause any increase in the deviation of the optical axis height. Secondly, the adjusting members (15/16) are located at the end sides of the optical element (10C), exactly at the same preferred positions as that of the claimed scanning line inclination correction means in the form of the stepping motor (1090) and the leaf spring (1095) with respect to the second scanning lens (1093) as shown in Fig. 16 of the current Application.

Applicant further argued that "the center of the optical element (10[C]) is also moved in the sub-scanning direction together with the body chassis (8)" (emphasis

added). The examiner respectfully disagrees. The movement of the adjusting members (15/16) only rotates the optical element (10C) around the rotation support (80) located at the center of the optical element, the rotation support being fixed to the body chassis (8), which in turn is screwed to the frame of the printer (Fig. 12). Therefore, the body chassis is not moved in the sub-scanning direction during the scanning line correction by the adjusting members (15/16), which only rotate the optical element around the fixed rotation support (80) provided by a fixed body chassis.

In conclusion, Suzuki clearly teaches the claimed supporting point in the form of the rotation support (80), which is positioned at the center of the optical element, near the optical axis L of the optical element (Fig. 9) and is in contact with the center of the holding member (14) in a plane parallel to the scanning line and perpendicular to the optical axis of the optical element (Figs. 9-10).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hai Chi Pham

HAI PHAM
PRIMARY EXAMINER
February 10, 2007